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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/522,045
Filing Date: January 19, 2005
Appellant(s): OKAMOTO ET AL.

Douglas P. Muller
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 19, 2009 appealing from the Office action mailed December 1, 2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The rejection of claims 1, 4-12, and 14-26 made under 35 U.S.C. 112, second paragraph, is withdrawn.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(8) Evidence Relied Upon

4683058	Lyman et al.	7-1987
5658779	Krupey et al.	8-1997
5726021	Britschgi et al.	3-1998
5747277	Tsuchiya	5-1998
US 2001/0033808	Wardlaw	10-2001
US 2001/0009759	Sato et al.	7-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A. Claims 1, 4-8, 10-12, 14, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998).

Regarding Claim 1 Sato teaches a method of collecting a virus from a liquid sample using particles capable of being bound by viruses (Abstract). Sato teaches a method of bringing a liquid sample into contact with the particles which in one embodiment are hydrogel particles which absorb water (para 0074). Thus Sato teaches contacting liquid sample with water absorbing particles so that the liquid phase of the

sample is absorbed by the water absorbing particles. Sato further teaches that the viruses are caught on the surface of the particles (para 0098). Thus Sato teaches that the viruses are caught on the surface of the water absorbing particles. Sato additionally teaches pouring a salt solution on the virus bound particles in order to disassociate viruses from the bound particles (para 0099). Thus Sato teaches contacting the water absorbing particles with a collecting solution so as to collect the microorganisms caught on the surface of the water absorbing particles. Regarding Claim 4 Sato teaches a method wherein a centrifugation is performed at 15000 rpm for 10 min (para 0141). Regarding Claim 7 Sato teaches that the hydrogel particles comprise a sulfonic acid monomer and water-soluble cross-linkable monomer (Para 0074). Thus Sato teaches a method wherein the water absorbing particles are hydrophilic cross-linked polymers having a hydrophilic function group. Regarding Claim 8 Sato teaches a method wherein the microorganism to be detected is hepatitis B virus (para 0140-0142). Regarding Claim 10 Sato teaches a method wherein the samples are derived from plasma, serum, cell lysate, urea, saliva and the like (para 0096). Regarding Claim 14 Sato teaches a method further comprising extracting the viral nucleic acids and then amplifying the nucleic acids (para 0099-0102). Regarding Claim 25 Sato teaches the nucleic acids are analyzed by PCR (para 0140-0142).

Sato does not teach that the water absorbing resin particles (i.e. hydrogels) absorb substantially all of the liquid in the liquid phase of the sample (clm 1). Further Sato does not teach a method wherein the collecting solution is contacted with the water absorbing particles without separating the water absorbing particles from the

liquid phase (clm 1). Sato does not teach a method wherein the amount of the liquid sample is not greater than the water absorbing capacity of the water absorbing resin particles (clm 5). Sato does not teach a method wherein the amount to the collecting solution added is greater than a water absorbing capacity of the water absorbing resin particles that have absorbed the liquid phase part (clm 6). Sato does not teach a method wherein the amount of the liquid sample is in a range from 50μL to 500μL (clm 11) or in a range from 50 mL to 200 mL (clm 12).

However Wardlaw teaches a method that uses hydrogels for collecting microorganisms that are present in a liquid sample. Wardlaw teaches that the amount of hydrogel required to collect microorganisms from a liquid sample is dependent on the amount of the liquid in the sample. Wardlaw further teaches that it is typically desired to use enough hydrogel so that essentially all of the water in the sample will be absorbed (Para 0011). Thus Wardlaw teaches water absorbing resin particles that absorb substantially all of the liquid phase of sample no matter what size the liquid sample is. Further in instances where there is enough hydrogel to absorb essentially all of the water in the sample, one would not have to separate the water absorbing particles from the liquid phase prior to the collecting step for two reasons; (i) there would be nothing to separate because the water absorbing particles would have absorbed all of the liquid phase and (ii) the collection solution would not be absorbed by the water absorbing particles because the particles would be fully saturated from absorbing liquid in the sample.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Sato by using enough hydrogel particles to absorb essentially all of the liquid in the sample as suggested by Wardlaw (Para 0011). Using hydrogel particles capable of absorbing essentially all of the liquid in the sample would aid in the separation and purification of the virus from the sample. Further it would have been obvious to optimize the volume of the sample used to the amount of hydrogel or vice versa to achieve the best recovery of the microorganism. Additionally it would be obvious that the collection solution would not be absorbed by the water absorbing particles because the particles would be fully saturated from absorbing liquid in the sample.

Sato does not teach a method wherein the binding of the virus to the particles occurs on a planar filter supported so as to divide the centrifugation tube into an upper space and a lower space. Further Sato does not teach a method wherein during the centrifugation step the microorganisms accumulate at the bottom of the centrifugation tube.

However Lyman teaches a filter for a centrifuge tube. Specifically Lyman teaches a filter tube that is adapted to fit within the upper portion of a standard plastic centrifugation tube. The filter tube has a pressure filter at its lower end and an opening at its upper end for receiving liquids. When the filter tube is filled with a liquid sample comprising permeable and non permeable materials and the composite centrifuge tube and filter tube is spun in the centrifuge, the centrifugal force causes the permeable materials to flow through the filter and collect in the bottom of the centrifuge tube while

the non permeable materials are retained in the filter tube (abstract). Thus Lyman teaches pouring a liquid sample into a centrifugation tube and centrifuging the sample so that permeable materials pass through the filter and accumulate at the bottom of the centrifugation tube. Additionally Lyman teaches the filter is made out of polycarbonate (col 4, line 8).

Tsuchiya provides guidance on properly choosing a filter with an appropriate pore size for detecting a particular microorganism (Column 3, lines 45-60). For example Tsuchiya teaches that in order to trap a small bacterium on a filter one could use a filter with a pore size of 0.2μm. Therefore if you wanted that small bacteria to pass through the filter one could use a filter with a pore size larger than 0.2 μm.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention to have modified the method of Sato and Wardlaw by performing the step of binding the virus to the particles on a filter in a centrifuge tube and then centrifuging the tube so that the virus accumulates at the bottom of the centrifugation tube as suggested by Lyman and Tsuchiya. In the method of Sato after the salt solution is added, which makes the virus disassociate from the particles, one would be motivated to pass the salt solution and virus particles through a filter located in a centrifuge tube in order to collect the virus. Lyman teaches a composite filter tube and centrifuge tube that allows both separation by filtration through the tube into non permeable materials retained within filter tube and permeable materials collected in the centrifugation tube, and then the further separation of the permeable materials by specific gravity in the centrifuge tube (Column 4, lines 41-47). By placing a filter with

the appropriate pore size based on the guidance provided by Tsuchiya in the centrifugation tube of Lyman one can control what size particles or microorganisms are considered permeable. Thus all of the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

B. Claims 9 and 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998) as applied to claims 1, 8, and 14 above and in further view of Britschgi et al (US Patent 5726021 Issued 10-1998).

The teachings of Sato, Wardlaw, Lyman and Tsuchiya are presented above.

Regarding Claim 9 the combined references not teach a method used to collect M. tuberculosis.

However Britschgi et al teach a method of detecting and characterizing different species of Mycobacterium such as M. tuberculosis (Column 6, lines 11-26). Britschgi teaches that the Mycobacterium are present either in a cell culture or from a clinical sample (Column 6, lines 27-28). Further Britschgi teach that the cells can be concentrated prior to lysis by centrifugation and filtration means (Column 7 lines 15-17). After lysis the cellular nucleic acid is extracted and amplified (Columns 8 and 9).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of Sato, Wardlaw, Lyman and Tsuchiya for isolating M. tuberculosis from cultures before carrying out the nucleic acid extraction and amplification methods of Britschgi (Columns 8-9). An artisan would have been motivated to include the centrifugation step taught by Sato, Wardlaw, Lyman and Tsuchiya in the method of Britschgi because such a step would have allowed for the removal of the cell culture media, cellular debris and other contaminants in the sample which could interfere with the nucleic acid analysis.

Regarding Claims 16-19, 21-22, and 24 the combined references do not teach a method further comprising (i) heating the sample to between 70 ºC and 100ºC; (ii) heating the sample for 1 to 30 min; (iii) heating the sample for 96ºC for 10 min; (iv) using a extraction reagent with a pH between 7-12; (v) using a non ionic detergent; (vi) and using a metal chelating agent.

However Britschgi teaches a method for rapid and sensitive detection of Mycobacterium. The method comprises lysing the mycobacterium cells, extracting the nucleic acid from the lysed cells, and amplifying the lysed cells. Specifically Britschgi et al teach that cell lysis is completed by adding to the cell suspension a lysis reagent that contains a nonionic detergent (e.g. triton X which is a polyoxyethyleneglycol p-t-octylphenyl ether), and incubating the suspension at high temperatures. Britschgi et al further teach that the lysis solution typically has a pH between 6.5 and 10.5. The lysis buffer also preferably contains a chelating agent such as EDTA or EGTA. The cells are incubated in the lysis solution between 75ºC-99ºC until suitable lysis is observed.

Typically incubation take 5 minutes or longer at 85ºC. Following lysis the nucleic acids are further analyzed via PCR (Columns 8-9).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Sato, Wardlaw, Lyman and Tsuchiya by examining the cellular constituents by performing nucleic acid analysis as suggested by Britschgi. Using nucleic acid analysis as a method to further examine cells collected from bodily fluids was routinely used in the art at the time of the invention as demonstrated by Britschgi et al and thus it would have been obvious to an ordinary artisan to have examined the collected cells using nucleic acid analysis.

Regarding Claims 20 and 23 the combined references do not teach (i) a method wherein the concentration of the nonionic detergent in the extraction reagent solution is in a range from 0.01 to 10 wt %; or (ii) a method wherein the concentration of the metal chelating agent in the extraction reagent solution is 0.1 to 100 mM.

However, determining the optimum conditions for performing nucleic acid lysis would have been obvious to one of ordinary skill in the art and well within the skill of the art. As discussed in MPEP 2144.05(b), "(w)here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller,* 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

MPEP 2144.05(b):
"Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)"

"A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)."

C. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998), as applied to claim 14 above and in further view of Krupey (US Patent 5658779 Issued 8/1997).

The teachings of Sato, Wardlaw, Lyman, and Tsuchiya are presented above.

The combined references do not teach a method wherein the elution solution is also the lysis solution.

However Krupey teaches a method wherein virus particles are captured on water insoluble particles. Krupey further teaches that the viruses may be desorbed from the particles using extraction agents (Column 12, line 45-47).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Sato, Wardlaw, Lyman, and Tsuchiya by using one solution to elute and lysis the virus as suggested by Krupey. Using solutions capable of eluting and lysing viruses at the same time are beneficial because they save time by allowing the eluting and lysing steps to be performed simultaneously thus it would have been obvious to an ordinary artisan to have used such a solution in situations where it was desirable to collect a virus and used the virus for nucleic acid analysis.

(10) Response to Argument

A. Rejection of claims 1, 4-8, 10-12, 14, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998).

In the brief (pages 5-6) the Appellants summarize the teachings of Sato. Specifically Appellants state that Sato is directed to a method involving the use of particles for isolating viruses in a sample in preparation for nucleic acid amplification (para 0004). The Appellants state that Sato stresses the importance of being able to separate the viruses from the other components in the sample because the presence of the other components can inhibit PCR (paras 0006 and 0167). The Appellants point out that Sato teaches that the viruses bind to at least one of a cationic group and an anionic group that is present on the surface of the particles (paras 0020, 0023, and 0065). The Appellants note that Sato teaches that the cationic group or the anionic group must be present in certain amounts; otherwise the particles may not possess virus separating ability (paras 0023 and 0065). Further Appellants acknowledge that Sato indicates that the particles used can be hydrogel particles, but that Sato is silent as to the amounts of initiator or cross-linkers that can be used, which can impact significantly the liquid absorbing properties of hydrogels (para 0074). Additionally Appellants note that in the method of Sato, the particles are added to a sample in the form of a reagent prepared in

an aqueous dispersion (paras 0089 and 0097). Appellants also note that once the particles bind the viruses, the particles are removed from the liquid, e.g., by the use of magnets, and the viruses are then separated from the particles using a salt solution (paras 0098-0099).

In the brief (page 6) the Appellants argue that if Sato's particles absorbed substantially all of the liquid part of the sample, the particles would no longer be in a dispersed state within an aqueous medium as intended by Sato, and as such, one would question whether the particles would bind the viruses, and whether the virus bound particles could be separated from the other components present in the sample. Additionally the Appellants argue that there is nothing in Sato that teaches or suggests adding the sample into the virus separating agent so that substantially all of the liquid part of the sample is absorbed by the virus binding particles. Further the Appellants argue that there is nothing in Sato that teaches or suggests adding a collecting solution without separating the liquid phase part of the sample absorbed by the virus bound particles from the particles that have absorbed the liquid phase part of the sample.

This analysis has been fully considered but is not persuasive. Sato teaches a method of separating viruses that comprises the steps of: adding virus binding particles to a sample which possibly contains viruses, to allow the viruses to bind to the particles; and separating from the sample the particles to which the viruses have bound, to collect the viruses (paras 0091-0094). The rejection acknowledges that Sato does not teach a method wherein the water absorbing resin particles (i.e., hydrogel particles) absorb substantially all of the liquid phase part of the liquid sample. However it is emphasized

that this is a 103 rejection and that Wardlaw is being relied upon to teach this missing element. Specifically Wardlaw teaches a method wherein hydrogels are used for collecting microorganisms that are present in a liquid sample (abstract). Wardlaw teaches that it is typically desired to use enough hydrogel so that essentially all of the water in the sample will be absorbed (para 0011). Thus Wardlaw clearly teaches a method wherein the hydrogel absorbs "substantially all" of the liquid phase part of the liquid sample. Appellants argue that if Sato's particles absorbed substantially all of the liquid part of the sample the particles would no longer be in a dispersed state within an aqueous medium however this argument is not necessarily true. Wardlaw does not teach that the hydrogel absorbs "all" of the liquid phase part of the liquid sample, rather Wardlaw teaches that the hydrogel absorbs "essentially all" of the liquid phase part of the liquid sample. Therefore the combination of Sato and Wardlaw results in a method where the hydrogel particles do not absorb "all" of the liquid phase part of the liquid sample and as a result the hydrogel particles would still be in a dispersed state within an aqueous medium. Since the hydrogel particles would still be in a dispersed state within an aqueous medium they would still be expected to bind to the viruses.

In response to the question as to whether the virus bound particles could be separated from the other components present in the sample it is noted for the record that the claims are drawn to a method of collecting a microorganism or a cell from a liquid sample. The claims are not drawn to a method that further requires separating the microorganism or cell from formed constituents (such as proteins) which may also be present. The claims only require separating the microorganism or cell from the liquid

phase of the sample which Sato and Wardlaw both clearly teach. It is acknowledged that Sato teaches that is desirable to separate the viruses from the other components in the sample when doing PCR because the presence of the other components can inhibit PCR (paras 0006 and 0167), however this teaching is not relevant for two reasons (i) the present claims do not require PCR and (ii) Sato does not teach that the collected viruses must further be used for PCR. The two independent claims of this application (clms 1 and 14) do not require a step of performing PCR. While claim 14 recites a step of "amplifying or detecting specifically an extracted gene" and the detection could be performed by a method that does not require amplification such as oligonucleotide hybridization. Claim 25 is the only claim that requires performing a step of PCR. In view of the "comprising" language present in claims 1 and 14, additional purification steps can be performed when PCR is required to ensure that the PCR reaction is not inhibited. Additionally Sato does not teach that the collected viruses must further be used for PCR because Sato teaches that "the viruses having been separated by the particles are used to make nucleic acid extraction, examination, and diagnosis, in particular, examination and diagnosis involving nucleic acid amplification" (para 0019). This recitation has been interpreted to mean that the viruses can be used for nucleic acid extraction followed by nucleic acid amplification or they can be used for nucleic acid extraction followed by other means of examination that do not require nucleic acid amplification.

Additionally the rejection acknowledges that Sato does not teach a method wherein the collecting solution is poured into the centrifugation tube without separating

the liquid phase part absorbed by the water absorbing resin particles. Sato teaches pouring a salt solution on the virus bound particles in order to disassociate viruses from the bound particles (para 0099). In the instant case the salt solution is being interpreted as the "collecting solution" because it collects the viruses that have been caught on the surface of the water absorbing particles. Wardlaw teaches a method wherein hydrogels are used for collecting microorganisms that are present in a liquid sample (abstract). Wardlaw teaches that it is typically desired to use enough hydrogel so that essentially all of the water in the sample will be absorbed (para 0011). In instances where there is enough water absorbing particles to absorb essentially all of the liquid phase of the liquid sample one of skill in the art would have recognized that they would not be able to separate the liquid phase part absorbed by the water absorbing resin particles from the water absorbing resin particles prior to pouring in the collection solution because if they had the collection solution would have been absorbed by the water absorbing resin particle rather than disassociate and collect the viruses from the bound particles. Therefore it would have been obvious to one of skill in the art at the time of the invention to pour the collecting solution into the centrifugation tube without separating the liquid phase part absorbed by the water absorbing resin particles so that the collecting solution would not be absorbed by the water absorbing resin particles and so that the collecting solution could disassociate and collect the viruses as intended.

In the brief (pages 6-7) the Appellants also summarize the teachings of Wardlaw. Specifically they state that Wardlaw is directed to separating components such as bacteria and cells from a liquid phase of a sample (paras 0001 and 0012). Wardlaw

notes that the prior art teaches the separation of such constituents by the use of centrifugation and filtration, and that such methods can destroy the sample components or require prior knowledge as to the size of the target formed constituents (paras 0006-0007). In order to address such issues, the reference teaches a technique that operates in a quiescent manner and does not require the use of centrifugation or filters (para 0009). In particular, the reference teaches the use of hydrogels to absorb substantially all of the liquid in a sample and thereby capture bacteria and cells on the planar surface of the hydrogel (para 0012]). Thus it can be clearly understood that Wardlaw teaches that when a hydrogel absorbs substantially all of the liquid phase from a sample containing bacteria and cells, the bacteria and cells are drawn towards and captured on the surface of the hydrogel.

In the brief (page 7) the Appellants argue that Sato is directed to achieving a result that is completely different from that of Wardlaw. Appellants assert that Sato is directed to separating the viruses from other components such as protein to enhance sensitivity of the amplification, whereas Wardlaw is directed to separating formed constituents in general for the purposes of viewing the separated components with an optical instrument. Appellants argue that the use of hydrogel particles in amounts that would absorb essentially all of the liquid in the sample as taught by Wardlaw would frustrate the purposes of Sato because the use of the hydrogel particles would capture unwanted components that may adversely affect the amplification reaction of the viral gene which is often very sensitive to the presence of other components as indicated by Sato.

This analysis has been fully considered but is not persuasive. In the instant case both Sato and Wardlaw are drawn to methods of collecting a microorganism or a cell from a liquid sample and examining the collected microorganism or cell. As such both of the references are drawn to achieving a similar result. Sato teaches that "the viruses having been separated by the particles are used to make nucleic acid extraction, examination, and diagnosis, in particular, examination and diagnosis involving nucleic acid amplification" (para 0019). This recitation has been interpreted to mean that the viruses can be used for nucleic acid extraction followed by nucleic acid amplification or they can be used for nucleic acid extraction followed by other means of examination that do not require nucleic acid amplification. As such the argument that using the hydrogel particles in amounts that would absorb essentially all of the liquid in the sample would frustrate the purpose of Sato because the unwanted components would adversely affect the amplification is misleading. Appellants appear to believe that the sole purpose of Sato is to separate viruses and then use them for nucleic acid amplification however as discussed above nucleic acid amplification is not the only purpose disclosed by Sato. Further as discussed above the independent claims of this application (clms 1 and 14) do not require a step of performing PCR. Specifically claim 14 recites a step of "amplifying or detecting specifically an extracted gene" and the detection could be performed by a method that does not require amplification such as oligonucleotide hybridization.

In the brief (page 8) the Appellants argue that in order to absorb essentially all of the liquid of the sample in addition to the liquid from the virus separating reagent more

hydrogel particles would be needed. The Appellants state that Sato teaches that the addition of virus-binding particles in too large a quantity would be undesirable (para 0097). As such the Appellants argue that it is unclear as to whether the virus particles would even separate.

This analysis has been fully considered but is not persuasive. Sato teaches that the quantity of the virus separating reagent that is used depends on the concentration of viruses present in the sample. Sato teaches that the addition of virus separating reagent in too small a quantity puts a limitation on the number of viruses which can bind to the virus binding particles and results in poor separation efficiency. Sato also teaches that the addition of virus separating reagent in too large a quantity makes it necessary to use a detachment solution in a large quantity when bound viruses are detached in a post stage, resulting in a low separation efficiency (para 0097). One of skill in the art at the time of the invention would have recognized that the number of particles required would depend on the absorbent properties of the hydrogel particles, the amount of liquid present in the sample, and the amount of virus suspected of being in the sample. Based on this information one would be able to choose the appropriate number of particles to use to effectively separate the viruses from the sample.

In the brief (page 8) the Appellants also state that the rejection further contends that it would have been obvious to have modified the method of Sato and Wardlaw by performing the step of binding the virus to the particles on a filter in a centrifuge and then centrifuging the tube so that the virus accumulates at the bottom of the centrifugation tube as suggested by Lyman and Tsuchiya. Appellants argue that

Wardlaw leads away from the use of centrifugation and filters as taught by Lyman and Tsuchiya. Thus Appellants respectfully submit that it would not have been obvious to combine the references as indicated by the rejection.

This analysis has been fully considered but is not persuasive. Wardlaw teaches that it is desirable to separate formed constituents from a liquid sample without the use of a centrifuge (para 0009). The combination of Sato and Wardlaw results in a method wherein a microorganism or cell is separated from a liquid sample without the use of a centrifuge. The point in which the microorganism or cell is considered to be separated from the liquid sample is the point at which the liquid sample is absorbed the hydrogel. Here it is noted that the claims do not require a step of centrifuging until after the microorganism is already separated from the liquid sample. As such Wardlaw does not teach away from the claimed method. In the instant case it would have been obvious to one of ordinary skill in the art at the time the invention to have modified the method of Sato and Wardlaw by performing the step of binding the virus to the particles on a filter in a centrifuge tube and then centrifuging the tube so that the virus accumulates at the bottom of the centrifugation tube as suggested by Lyman and Tsuchiya. In the method of Sato after the salt solution is added, which makes the virus disassociate from the particles, one would be motivated to pass the salt solution and virus particles through a filter located in a centrifuge tube in order to collect the virus. Lyman teaches a composite filter tube and centrifuge tube that allows both separation by filtration through the tube into non permeable materials retained within filter tube and permeable materials collected in the centrifugation tube, and then the further separation of the

permeable materials by specific gravity in the centrifuge tube (Column 4, lines 41-47). By placing a filter with the appropriate pore size based on the guidance provided by Tsuchiya in the centrifugation tube of Lyman one can control what size particles or microorganisms are considered permeable. Thus all of the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

B. Rejection of claims 9 and 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998) as applied to claims 1, 8, and 14 above and in further view of Britschgi et al (US Patent 5726021 Issued 10-1998).

In the brief (page 9) Appellants state that they are not contesting the relevance of Britschgi to claims 9 and 16-24 nor its suitability for combination with Sato, Wardlaw, Lyman and Tsuchiya. Appellants assert that claims 9 and 16-24 are allowable for at least the reasons discussed above for its independent claim 1.

Appellant's arguments regarding the combination of Sato, Wardlaw, Lyman and Tsuchiya have been fully addressed above in the response pertaining to claims 1, 4-8,

10-12, 14, and 25-26. The response to Appellants arguments, as set forth above, applies equally to the present grounds of rejection.

C. Rejection of claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 2001/0009759) in view of Wardlaw (US Patent 2001/0033808), Lyman (US Patent 4683058 Issued 1987), and Tsuchiya (US Patent 57472747 Issued 1998) as applied to claim 14 above and in further view of Krupey (US Patent 5658779 Issued 8/1997).

In the brief (page 9) Appellants state that they are not contesting the relevance of Krupey to claim 15 nor its suitability for combination with Sato, Wardlaw, Lyman and Tsuchiya. Claim 15 is allowable for at least the reasons discussed above for its independent claim 1.

Appellant's arguments regarding the combination of Sato, Wardlaw, Lyman and Tsuchiya have been fully addressed above in the response pertaining to claims 1, 4-8, 10-12, 14, and 25-26. The response to Appellants arguments, as set forth above, applies equally to the present grounds of rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Amanda Shaw
Art Unit 1634

/Juliet C Switzer/
Primary Examiner, Art Unit 1634

Conferees:

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